CHAPTER 33-10-12
RADIATION SAFETY REQUIREMENTS FOR WIRELINE SERVICE OPERATIONS AND SUBSURFACE TRACER STUDIES

33-10-12-01. Purpose. This chapter establishes radiation safety requirements for persons using sources of radiation for wireline service operations including well logging, mineral logging, radioactive tracers, radioactive markers, and uranium sinker bars. The requirements of this chapter are in addition to, and not in substitution for, other requirements of chapters 33-10-01, 33-10-03, 33-10-04.1, 33-10-10, 33-10-11, and 33-10-13.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 1994; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-02. Scope. This chapter applies to all licensees or registrants who use sources of radiation for wireline service operations including well logging, mineral logging, radioactive tracers, radioactive markers, or uranium sinker bars. The requirements set out in this chapter do not apply to the issuance of a license authorizing the use of licensed material in tracer studies involving multiple wells, such as field flooding studies, or the use of sealed sources auxiliary to well logging but not lowered into wells.

History: Effective June 1, 1986; amended effective March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-03. Definitions. As used in this chapter, the following definitions apply:

1. "Energy compensation source (ECS)" means a small sealed source, with an activity not exceeding three and seven-tenths megabecquerels [100 microcuries], used within a logging tool or other tool components to provide a reference standard to maintain the tool's calibration when in use.

2. "Field station" means a facility where radioactive sources may be stored or used and from which equipment is dispatched to temporary jobsites.

3. "Fresh water aquifer" means a geologic formation that is capable of yielding fresh water to a well or spring.

4. "Injection tool" means a device used for controlled subsurface injection of radioactive tracer material.

5. "Logging assistant" means any individual who, under the personal supervision of a logging supervisor, handles sealed sources or tracers that are not in logging tools or shipping containers or who performs surveys required by subsection 1 of section 33-10-12-08.

6. "Logging supervisor" means the individual who uses sources of radiation or provides personal supervision of the utilization of sources of radiation at a temporary jobsite and who is responsible to the licensee for assuring compliance with department requirements and conditions of the license.

7. "Logging tool" means a device used subsurface to perform well logging.

8. "Mineral logging" means any logging performed for the purpose of mineral exploration other than oil or gas.

9. "Personal supervision" means guidance and instruction by the supervisor who is physically present at the jobsite and watching the performance of the operation in such proximity that contact can be maintained and immediate assistance given as required.

10. "Radioactive marker" means radioactive material placed subsurface or on a structure intended for subsurface use for the purpose of depth determination or direction orientation. This term includes radioactive collar markers and radioactive iron nails.

11. "Safety review" means a periodic review provided by the licensee for its employees on radiation safety aspects of well logging. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, accidents or errors that have been observed, and opportunities for employees to ask questions.

12. "Source holder" means a housing or assembly into which a radioactive source is placed to facilitate the handling and use of the source in well logging operations.

13. "Subsurface tracer study" means the release of a substance tagged with radioactive material for the purpose of tracing the movement or position of the tagged substance in the well bore or adjacent formation.

14. "Surface casing for protecting fresh water aquifers" means a pipe or tube used as a lining in the well to isolate fresh water aquifers from the well.

15. "Temporary jobsite" means a location where radioactive materials are present for the purpose of performing wireline service operations or subsurface tracer studies.

16. "Tritium neutron generator target source" means a tritium source used within a neutron generator tube to produce neutrons for use in well logging applications.

17. "Uranium sinker bar" means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.

18. "Well" or "well bore" means a drilled hole in which wireline service operations and subsurface tracer studies are performed.

19. "Well logging" means all operations involving the lowering and raising of measuring devices or tools which may contain sources of radiation into well bores or cavities for the purpose of obtaining information about the well or adjacent formations.

20. "Wireline" means a cable containing one or more electrical conductors which is used to lower and raise logging tools in the well bore.

21. "Wireline service operation" means any evaluation or mechanical service which is performed in the well bore using devices on a wireline.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-04. Prohibition. A licensee may perform well logging with a sealed source only after the licensee has a written agreement with the employing well owner or operator. This written agreement must identify who will meet the following requirements:

1. In the event a sealed source is lodged downhole, a reasonable effort at recovery will be made.

2. In the event a decision is made to abandon the sealed source downhole, the requirements of subsection 3 of section 33-10-12-09 shall be met.

3. The required radiation monitoring will be performed.

4. A person may not attempt to recover a sealed source in a manner which, in the licensee’s opinion, could result in its rupture.

5. If the environment, any equipment, or personnel are contaminated with licensed material, they shall be decontaminated before release from the site or released for unrestricted use.

6. The licensee shall retain a copy of the written agreement for three years after the completion of the well logging operation.

7. The licensee may apply for department approval, on a case-by-case basis, of proposed procedures to abandon an irretrievable well logging source in a manner not otherwise authorized by this chapter.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-04, 23-20.1-08

33-10-12-05. Equipment control.

1. **Limits on levels of radiation.** Sources of radiation shall be used, stored, and transported in such a manner that the transportation requirements of chapter 33-10-13 and the dose limitation requirements of chapter 33-10-04.1 are met.

2. **Storage precautions.**

   a. Each source of radiation, except accelerators, must be provided with a storage or transport container. The container shall be provided with a lock, or tamper seal for calibration sources, to prevent unauthorized removal of, or exposure to, the source of radiation.

   b. Sources of radiation shall be stored in a manner which will minimize danger from explosion or fire.

3. **Transport precautions.** Transport containers shall be physically secured to the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal.

4. **Radiation survey instruments.**

   a. The licensee or registrant shall maintain sufficient calibrated and operable radiation survey instruments at each field station to make physical radiation surveys as required by this chapter and by section 33-10-04.1-09. Instrumentation shall be capable of measuring one microsievert [0.1 millirem] per hour through at least five hundred microsievert [50 millirem] per hour.

   b. Each radiation survey instrument shall be calibrated:

(1) At intervals not to exceed six months and after each instrument servicing except battery replacement;

(2) For linear scale instruments, at two points located approximately one-third and two-thirds of full-scale on each scale; for logarithmic scale instruments, at midrange of each decade, and at two points of at least one decade; and for digital instruments, at appropriate points; and

(3) So that accuracy within plus or minus twenty percent of the true radiation level can be demonstrated on each scale.

c. Calibration records shall be maintained for a period of three years for inspection by the department.

5. **Leak testing of sealed sources.**

a. Requirements. Each licensee using sealed sources of radioactive material shall have the sources tested for leakage. Records of leak test results shall be kept in units of becquerels [microcuries] and maintained for inspection by the department for three years from the date the leak test is performed.

b. The wipe of a sealed source shall be performed using a leak test kit or method approved by the department, the United States nuclear regulatory commission, an agreement state, or a licensing state. The wipe sample must be taken from the nearest accessible point to the sealed source where contamination might accumulate. The wipe sample must be analyzed for radioactive contamination. The analysis must be capable of detecting the presence of one hundred eighty-five becquerels [0.005 microcurie] of radioactive material on the test sample and must be performed by a person approved by the department, the United States nuclear regulatory commission, an agreement state, or a licensing state to perform the analysis.

c. Interval of testing.

(1) Each sealed source of radioactive material, except an energy compensation source (ECS), shall be tested at intervals not to exceed six months. In the absence of a certificate from a transferor indicating that a test has been made prior to the transfer, the sealed source may not be put into use until tested. If, for any reason, it is suspected that a sealed source may be leaking, it shall be removed from service immediately and tested for leakage as soon as practical.

(2) Each energy compensation source that is not exempt from testing in accordance with subdivision e must be tested at intervals not to exceed three years. In the absence of a

certificate from the transferor indicating that a test has been made within the last three years before the transfer, the energy compensation source may not be used until tested.

d. Leaking or contaminated sources. If the test reveals the presence of one hundred eighty-five becquerels [0.005 microcurie] or more of leakage or contamination, the licensee shall immediately withdraw the source from use and shall cause it to be decontaminated, repaired, or disposed of in accordance with this article. A report describing the equipment involved, the test results, and the corrective action taken shall be filed with the department within five days of receiving the test results.

e. Exemptions. The following sources are exempt from the periodic leak test requirements of subdivisions a, b, c, and d of this subsection:

(1) Hydrogen-3 (tritium) sources.

(2) Sources of radioactive material with a half-life of thirty days or less.

(3) Sealed sources of radioactive material in gaseous form.

(4) Sources of beta-emitting or gamma-emitting, or both, radioactive material with an activity of three and seven-tenths megabecquerels [100 microcuries] or less.

(5) Sources of alpha-emitting or neutron-emitting, or both, radioactive material with an activity of three hundred seventy kilobecquerels [10 microcuries] or less.

6. **Physical inventory.** Each licensee or registrant shall conduct a semiannual physical inventory to account for all sources of radiation. Records of inventories shall be maintained for three years from the date of the inventory for inspection by the department and shall include the quantities and kinds of sources of radiation, the location where sources of radiation are assigned, the date of the inventory, and the name of the individual conducting the inventory. Physical inventory records may be combined with leak test records.

7. **Utilization records.** Each licensee or registrant shall maintain current records, which shall be maintained for inspection by the department for three years from the date of the recorded event, showing the following information for each source of radiation:

a. Make, model number, and a serial number or a description of each source of radiation used.

b. The identity of the well-logging supervisor or field unit to whom assigned.

c. Locations where used and dates of use.

d. In the case of tracer materials and radioactive markers, the utilization record shall indicate the radionuclide and activity used in a particular well, and the disposition of any unused tracer material.

8. **Design, performance, and certification criteria for sealed sources used in downhole operations.**

a. A licensee may use a sealed source for use in well logging applications if:

(1) The sealed source is doubly encapsulated;

(2) The sealed source contains licensed material whose chemical and physical forms are as insoluble and nondispersible as practical; and

(3) Meets the requirements of subdivision b, c, or d of this subsection.

b. For a sealed source manufactured on or before July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the requirements of USASI N5.10-1968, "Classification of Sealed Radioactive Sources", or the requirements in subdivision c or d of this subsection.

c. For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the oil well logging requirements of ANSI/HPS N43.6-1997, "Sealed Radioactive Sources - Classification".

d. For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications, if:

(1) The sealed source’s prototype has been tested and found to maintain its integrity after each of the following tests:

(a) Temperature. The test source must be held at minus forty degrees Celsius for twenty minutes, six hundred degrees Celsius for one hour, and then be subject to a thermal shock test with a temperature drop from six hundred degrees Celsius to twenty degrees Celsius within fifteen seconds.

(b) Impact test. A five kilogram steel hammer, two and five-tenths centimeter in diameter, must be dropped from a height of one meter onto the test source.

(c) Vibration test. The test source must be subject to a vibration from twenty-five hertz to five hundred hertz at five times the acceleration of gravity for thirty minutes.

(d) Puncture test. A one gram hammer and pin, three-tenths centimeter pin diameter, must be dropped from a height of one meter onto the test source.

(e) Pressure tests. The test source must be subject to an external pressure of 1.695×10^7 pascals [24600 pounds per square inch absolute].

e. The requirements in subdivision a, b, c, or d of this subsection do not apply to sealed sources that contain licensed material in gaseous form.

f. The requirements in subdivision a, b, c, or d of this subsection do not apply to energy compensation sources (ECS). These must be registered with the department under chapter 33-10-03 or with the United States nuclear regulatory commission or another agreement state.

g. Certification documents shall be maintained for inspection by the department for a period of three years after source disposal. If the source is abandoned downhole, the certification documents shall be maintained until the department authorizes disposition.

9. **Labeling.**

a. Each source, source holder, or logging tool containing radioactive material shall bear a durable, legible, and clearly visible marking or label, which has, as a minimum, the standard radiation caution symbol, without the conventional color requirement, and the following wording:

CAUTION* RADIOACTIVE MATERIAL

This labeling shall be on the smallest component transported as a separate piece of equipment.

b. Each transport and storage container shall have permanently attached to it a durable, legible, and clearly visible label which has, as a minimum, the standard radiation caution symbol and the following wording:

CAUTION* RADIOACTIVE MATERIAL
NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)

* or DANGER

c. The licensee may not transport licensed material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with regulations set out in chapter 33-10-13.

10. **Inspection and maintenance.**

a. Each licensee shall visually check source holders, logging tools, and source handling tools for defects before each use to ensure that the equipment is in good working condition and that the required labeling is present.

b. Each licensee or registrant shall conduct, at intervals not to exceed six months, a program of inspection and maintenance of source holders, logging tools, source handling tools, storage containers, transport containers, uranium sinker bars, and injection tools to assure proper labeling and physical condition. Records of inspection and maintenance shall be maintained for a period of three years for inspection by the department.

c. If any inspection conducted pursuant to subdivision a or b of this subsection reveals damage to labeling or components critical to radiation safety, the device shall be removed from service until repairs have been made. A record must be made listing the date of check, name of inspector, equipment involved, defects found, and repairs made. These records must be maintained for three years after the defect is found.

d. If a sealed source is stuck in the source holder, the licensee may not perform any operation, such as drilling, cutting, or chiseling, on the source holder unless the licensee is specifically approved by the United States nuclear regulatory commission, an agreement state, or a licensing state to perform this operation.

e. The repair, opening, or modification of any sealed source shall be performed only by persons specifically authorized to do so by the department, the United States nuclear regulatory commission, an agreement state, or a licensing state.

11. **Subsurface tracer studies.**

a. The licensee shall require all personnel handling radioactive tracer material to use protective gloves and, if required by the license,

other protective clothing and equipment. The licensee shall take precautions to avoid ingestion or inhalation of radioactive tracer material and to avoid contamination of field stations and temporary jobsites.

b. A licensee shall not knowingly inject licensed material into fresh water aquifers unless specifically authorized by the department.

12. **Radioactive markers.** The licensee may use radioactive markers in wells only if the individual markers contain quantities of radioactive material not exceeding the quantities specified in schedule B of chapter 33-10-03. The use of markers is subject only to the requirements of subsection 6.

13. **Uranium sinker bars.** The licensee may use a uranium sinker bar in well logging applications only if it is legibly impressed with the words, "CAUTION: RADIOACTIVE - DEPLETED URANIUM", and, "NOTIFY CIVIL AUTHORITIES (or COMPANY NAME) IF FOUND."

14. **Use of a sealed source in a well without a surface casing.** The licensee may use a sealed source in a well without a surface casing for protecting fresh water aquifers only if the licensee follows a procedure for reducing the probability of the source becoming lodged in the well. The procedure must be approved by the department, the United States nuclear regulatory commission, or another agreement state.

15. **Energy compensation source.** The licensee may use an energy compensation source (ECS) which is contained within a logging tool, or other tool components, only if the energy compensation source contains quantities of licensed material not exceeding three and seven-tenths megabecquerels [100 microcuries].

a. For well logging applications with a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of subsections 5, 6, and 7 of section 33-10-12-05.

b. For well logging applications without a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of section 33-10-12-04; subsections 5, 6, 7, and 14 of section 33-10-12-05; and section 33-10-12-09.

16. **Tritium neutron generator target source.**

a. Use of a tritium neutron generator target source, containing quantities not exceeding one thousand one hundred ten megabecquerels [30 curies] and in a well with a surface casing to protect fresh water aquifers, is subject to the requirements of this chapter except section 33-10-12-04, subsection 8 and section 33-10-12-09.

b. Use of a tritium neutron generator target source, containing quantities exceeding one thousand one hundred ten megabecquerels [30 curies] or in a well without a surface casing to protect fresh water aquifers, is subject to the requirements of this chapter except subsection 8.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 1994; May 1, 1998; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-06. Requirement for personnel safety.

1. **Training requirements.**

a. No licensee or registrant may permit any individual to act as a logging supervisor as defined in this chapter until such individual has:

(1) Received, in a course recognized by the department, the United States nuclear regulatory commission, an agreement state, or a licensing state, instruction in the subjects outlined in appendix A of this chapter and demonstrated an understanding thereof by successfully completing a written test.

(2) Read and received instruction in the rules contained in this chapter and the applicable sections of chapters 33-10-01, 33-10-04.1, and 33-10-10 or their equivalent, conditions of appropriate license or certificate of registration, and the licensee's or registrant's operating and emergency procedures, and demonstrated an understanding thereof by successfully completing a written test.

(3) Has completed on-the-job training and demonstrated competence in the use of sources of radiation, related handling tools, and radiation survey instruments by a field evaluation.

b. No licensee or registrant may permit any individual to act as a logging assistant or to assist in the handling of sources of radiation until such individual has:

(1) Received instruction in applicable rules of this chapter and applicable sections of chapters 33-10-01, 33-10-04.1, and 33-10-10 or their equivalent and demonstrated an understanding thereof by successfully completing a written or oral test.

(2) Read or received instruction in the licensee's or registrant's operating and emergency procedures and demonstrated an understanding thereof by successfully completing a written or oral test.

(3) Demonstrated competence to use, under the personal supervision of the logging supervisor, the sources of radiation, related handling tools, and radiation survey instruments which will be used on the job.

c. The licensee or registrant shall provide safety reviews for logging supervisors and logging assistance at least once during each calendar year.

d. The licensee or registrant shall maintain employee training records for inspection by the department for three years following termination of employment. Records of annual safety reviews must list the topics discussed and also be retained for three years.

2. **Operating and emergency procedures.** The licensee's or registrant's operating and emergency procedures shall include instructions in at least the following:

a. Handling and use of sources of radiation, including the use of sealed sources in wells without surface casing for protecting fresh water aquifers if appropriate to be employed so that no individual is likely to be exposed to radiation doses in excess of the standards established in chapter 33-10-04.1.

b. Methods and occasions for conducting radiation surveys, including surveys for decontamination, as required by section 33-10-12-08.

c. Methods and occasions for locking and securing sources of radiation.

d. Personnel monitoring and the use of personnel monitoring equipment.

e. Transportation to temporary jobsites and field stations, including the packaging and placing of sources of radiation in vehicles, placarding the vehicles, and physically securing sources of radiation in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal.

f. Minimizing exposure of individuals in the event of an accident or from inhalation and ingestion of tracer materials.

g. Procedure for notifying proper personnel in the event of an accident.

h. Maintenance of records.

i. Inspection and maintenance of sealed sources, source holders, logging tools, source handling tools, storage containers, transport containers, injection tools, and uranium sinker bars.

j. Procedures to be followed in the event a sealed source is lodged downhole.

k. Procedures to be used for picking up, receiving, and opening packages containing radioactive material.

l. For the use of tracers, decontamination of the environment, equipment, and personnel.

m. Maintenance of records generated by logging personnel at temporary jobsites.

n. Actions to be taken if a sealed source is ruptured, including actions to prevent the spread of contamination and minimize inhalation and ingestion of radioactive material and actions to obtain suitable radiation survey instruments as required by subsection 4 of section 33-10-12-05.

o. Use of remote handling tools for handling sealed sources and tracer material except low-activity calibration sources.

3. **Personnel monitoring.**

a. The licensee or registrant shall not permit any individual to act as a logging supervisor or logging assistant or to assist in the handling of sources of radiation unless each such individual wears, at all times during the handling of licensed radioactive materials, a personnel dosimeter that is processed and evaluated by an accredited national voluntary laboratory accreditation program (NVLAP) processor. Each personnel dosimeter shall be assigned to and worn by only one individual. Film badges must be replaced at least monthly and other personnel dosimeters replaced at least quarterly. After replacement, each personnel dosimeter must be promptly processed.

b. The licensee shall provide bioassay services to individuals using radioactive material in subsurface tracer studies if required by the license.

c. The licensee or registrant shall retain personnel monitoring records and bioassay results for inspection until the department authorizes disposition of the records.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 1994; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-07. Precautionary procedures in logging and subsurface tracer operations.

1. **Security.**

   a. A logging supervisor must be physically present at a temporary jobsite whenever radioactive material is being handled or is not stored and locked in a vehicle or storage place. The logging supervisor may leave the jobsite in order to obtain assistance if a source becomes lodged in a well.

   b. During each logging or tracer application, except when the radiation sources are below ground or in secure shipping or storage containers, the logging supervisor or other designated employee shall maintain direct surveillance of the operation to protect against unauthorized or unnecessary entry into a restricted area, as defined in chapter 33-10-01.

2. **Handling tools.** The licensee shall provide and require the use of tools that will assure remote handling of sealed sources and tracer material other than low activity calibration sources.

3. **Particle accelerators.** No licensee or registrant may permit aboveground testing of particle accelerators, designed for use in well logging, which results in the production of radiation, except in areas or facilities controlled or shielded so that the requirements of subsections 1, 7, and 8 of section 33-10-04.1-06 and section 33-10-04.1-07, as applicable, are met.

4. **Radioactive contamination control.**

   a. If the licensee detects evidence that a sealed source has ruptured or radioactive material has caused contamination, the licensee shall initiate the emergency procedures required by subsection 2 of section 33-10-12-06.

   b. If contamination results from the use of radioactive material in well logging, the licensee shall decontaminate all work areas, equipment, and unrestricted areas.

c. During efforts to recover a sealed source lodged in a well, the licensee shall continuously monitor, with an appropriate radiation detection instrument or logging tool with a radiation detector, the circulating fluids from the well, if any, to check for contamination resulting from damage to the sealed source.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 1994; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-08. Radiation surveys and records.

1. **Radiation surveys.**

a. Radiation surveys or calculations shall be made and recorded for each area where radioactive materials are used or stored.

b. Radiation surveys or calculations shall be made and recorded for the radiation levels in occupied positions and on the exterior of each vehicle used to transport radioactive material. Such surveys or calculations shall include each source of radiation or combination of sources to be transported in the vehicle.

c. After removal of the sealed source from the logging tool and before departing the jobsite, the logging tool detector shall be energized, or a survey meter used, to assure that the logging tool is free of contamination.

d. If the licensee has reason to believe that, as a result of any operation involving a sealed source, the encapsulation of the sealed source could be damaged by the operation, the licensee shall conduct a radiation survey, including a contamination survey, during and after the operation.

e. Radiation surveys shall be made and recorded at the jobsite or wellhead for each tracer operation, except those using hydrogen-3, carbon-14, and sulfur-35. These surveys shall include measurements of radiation levels before and after the operation.

f. Records required pursuant to subdivisions a, b, c, d, and e shall include the dates, the identification of individuals making the survey, the identification of survey instruments used, and an exact description of the location of the survey. Records of these surveys shall be maintained for inspection by the department for three years after completion of the survey.

2. **Documents and records required at field stations.** Each licensee or registrant shall maintain, for inspection by the department, the following

documents and records for the specific devices and sources used at the field station:

a. Appropriate license, certificate of registration, or equivalent documents.

b. Operating and emergency procedures.

c. Applicable chapters of this article.

d. Records of the latest survey instrument calibrations pursuant to subsection 4 of section 33-10-12-05.

e. Records of the latest leak test results pursuant to subsection 5 of section 33-10-12-05.

f. Physical inventories required pursuant to subsection 6 of section 33-10-12-05.

g. Utilization records required pursuant to subsection 7 of section 33-10-12-05.

h. Records of inspection and maintenance required pursuant to subsection 10 of section 33-10-12-05.

i. Survey records required pursuant to subsection 1 of this section.

j. Training records required pursuant to subsection 1 of section 33-10-12-06.

3. **Documents and records required at temporary jobsites.** Each licensee or registrant conducting operations at a temporary jobsite shall have the following documents and records available at that site for inspection by the department.

a. Operating and emergency procedures.

b. Survey records required pursuant to subsection 1 for the period of operation at the site.

c. Evidence of current calibration for the radiation survey instruments in use at the site.

d. When operating in the state under reciprocity, a copy of the appropriate license, certificate of registration, or equivalent documents.

e. Shipping papers for the transportation of radioactive material.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-12-09. Notification of incidents, abandonment, and lost sources.

1. Notification of incidents and sources lost in other than downhole logging operations shall be made in accordance with appropriate provisions of chapter 33-10-04.1.

2. Whenever a sealed source or device containing radioactive material is lodged downhole, the licensee shall:

   a. Monitor at the surface for the presence of radioactive contamination with a radiation survey instrument or logging tool during logging tool recovery operations.

   b. Notify the department immediately by telephone and subsequently within thirty days, by confirmatory letter if the licensee knows or has reason to believe that a sealed source has been ruptured. This letter must identify the well or other location, describe the magnitude and extent of the escape of radioactive material, assess the consequences of the rupture, and explain efforts planned or being taken to mitigate these consequences.

3. When it becomes apparent that efforts to recover the radioactive source will not be successful, the licensee shall:

   a. Advise the well operator of an appropriate method of abandonment, which shall include:

      (1) The immobilization and sealing in place of the radioactive source with a cement plug.

      (2) A means to prevent inadvertent intrusion on the source, unless the source is not accessible to any subsequent drilling operations.

      (3) A permanent identification plaque, constructed of long-lasting material such as stainless steel, brass, bronze, or monel, must be mounted at the surface of the well, unless the mounting of the plaque is not practical. The size of the plaque must be at least seventeen centimeters (7 inches) square and three millimeters (1/8-inch thick). The plaque must contain the information required by subsection 4.

b. Notify the department by telephone of the circumstances of the loss and:

(1) Request approval of the proposed abandonment procedures; or

(2) State that the licensee implemented abandonment before receiving department approval because the licensee believed there was an immediate threat to public health and safety.

c. File a written report with the department within thirty days of the abandonment. The licensee shall also send a copy of the report to:

North Dakota Industrial Commission
Oil and Gas Division
600 East Boulevard
Bismarck, North Dakota 58505

The report must contain the following information:

(1) Date of occurrence.

(2) A description of the well logging source involved, including the radionuclide and its quantity, chemical, and physical form.

(3) Surface location and identification of well.

(4) Results of efforts to immobilize and set the source in place.

(5) A brief description of the attempted recovery effort.

(6) Depth of the radioactive source.

(7) Depth of the top of the cement plug.

(8) Depth of the well.

(9) The immediate threat to public health and safety justification for implementing abandonment prior to obtaining approval from the department.

(10) Any other information, such as a warning statement, contained on the permanent identification plaque.

(11) The names of the state agencies receiving a copy of this report.

4. Whenever a sealed source containing radioactive material is abandoned downhole, the licensee shall provide a permanent plaque for posting the well or well bore. An example of a suggested plaque is shown in appendix B of this chapter. This plaque shall:

   a. Be constructed of long-lasting material as described in paragraph 3 of subdivision a of subsection 3.

   b. Contain the following information engraved on its face:

      (1) The word "CAUTION".

      (2) The radiation symbol without the conventional color requirement.

      (3) The date of abandonment.

      (4) The name of the well operator or well owner.

      (5) The well name and well identification number or other designation.

      (6) The sealed sources by radionuclide and activity.

      (7) The source depth and the depth to the top of the plug.

      (8) An appropriate warning, depending on the specific circumstances of each abandonment. Appropriate warnings may include: (a) "Do not drill below plug back depth"; (b) "Do not enlarge casing"; or (c) "Do not reenter this well", followed by the words, "before contacting the North Dakota department of health".

5. The licensee shall immediately notify the department by telephone and subsequently by confirming letter if the licensee knows or has reason to believe that radioactive material has been lost in or in proximity to an underground potable acquifer. Such notice shall designate the well location and shall describe the magnitude and extent of loss of radioactive material, assess the consequences of such loss, and explain efforts planned or being taken to mitigate these consequences.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 1994; May 1, 1998; March 1, 2003.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

APPENDIX A
SUBJECTS TO BE INCLUDED IN TRAINING COURSES FOR LOGGING SUPERVISORS

I. Fundamentals of radiation safety.

A. Characteristics of radiation.

B. Units of radiation dose and quantity of radioactivity.

C. Significance of radiation dose.

1. Radiation protection standards.

2. Biological effects of radiation dose.

D. Levels of radiation from licensed material.

E. Methods of minimizing radiation dose.

1. Working time.

2. Working distance.

3. Shielding.

F. Radiation safety practices including prevention of contamination and methods of decontamination.

II. Radiation detection instrumentation to be used.

A. Use of radiation survey instruments.

1. Operation.

2. Calibration.

3. Limitations.

B. Survey techniques.

C. Use of personnel monitoring equipment.

III. Equipment to be used.

A. Handling equipment.

B. Sources of radiation.

C. Storage and control of equipment.

D. Operation and control of equipment.

E. Maintenance of equipment.

IV. Storage, control, and disposal of licensed material.

V. The requirements of pertinent federal regulations and this article.

VI. The licensee's or registrant's written operating and emergency procedures.

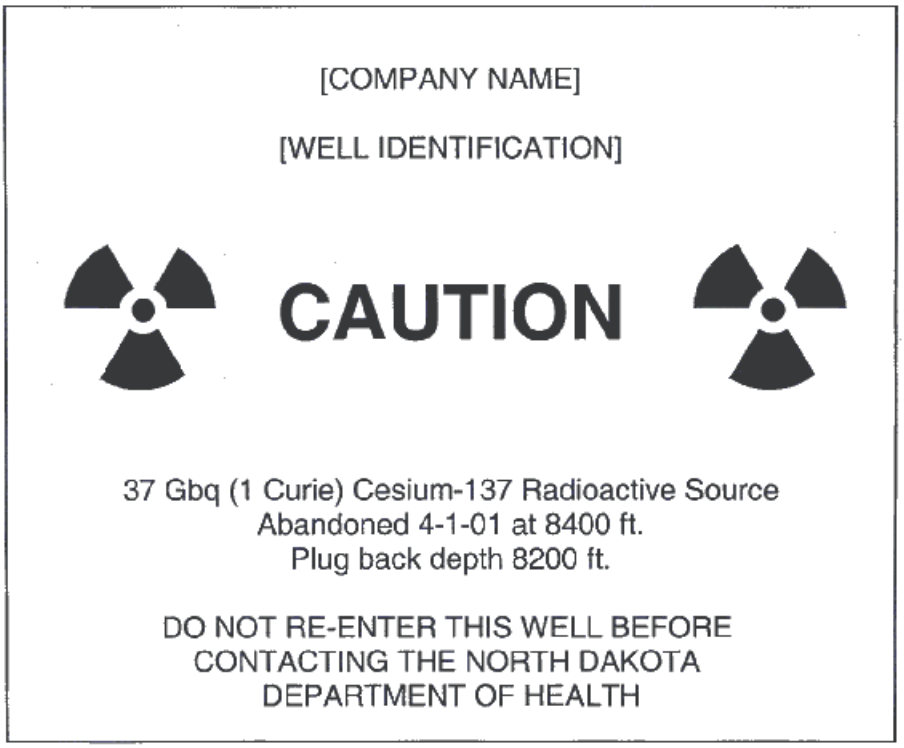
VII. The licensee's or registrant's recordkeeping procedures.

VIII. Case histories of accidents in well logging.

History: Effective June 1, 1986; amended effective June 1, 1992; March 1, 2003.

APPENDIX B

Example of plaque for identifying wells containing sealed sources of radioactive material abandoned downhole.



The size of the plaque should be convenient for use on active or inactive wells, e.g., a 17-centimeter (7 inch) square. Letter size or the word "CAUTION" should be approximately twice the size of the rest of the information.

History: Effective June 1, 1986; amended effective June 1, 1992.